SECTION 702
MOBILIZATION

702.01 DESCRIPTION.

This work consists of preparatory work and operations, including: movement of personnel, equipment, and supplies, establishment of offices, Contractor's buildings, and facilities necessary for work on the Project; and all other work and operations which must be performed, or costs incurred, before beginning work on the Project site.

702.02 PAYMENTS.

Partial Contract payments will be made for Mobilization using the following schedule:

When the listed percentage of the original Contract amount is earned, the percentage of the amount bid for Mobilization, or the percentage of original Contract amount, whichever is less, will be paid.

Amount Earned of:	**Pay Lesser of:**	
Total Contract	**Mobilization Bid Amount**	**Total Contract Amount**
5%	25%	2-1/2%
10%	50%	5%
50%	100%	7-1/2%
75%	100%	10%

Upon completion of all work on the Project, payment of any amount bid for Mobilization in excess of 10% of the original Contract amount will be paid.

SECTION 704
TRAFFIC CONTROL

704.01 DESCRIPTION.

This work consists of furnishing, installing, and maintaining all required traffic control devices according to the traffic control plan details shown on the Plans. This includes

Specifications providing for watch persons, flaggers, pilot cars, and necessary precautions for protecting the public, the workers, and the work.

All traffic control devices and their placement shall meet the standards and requirements of the "Manual on Uniform Traffic Control Devices for Streets and Highways" (MUTCD) and the "Standard Highway Signs," published by the Federal Highway Administration. All Category II Traffic Control Devices purchased after October 1, 2000, shall meet the requirements of NCHRP Report 350. There will be a 5-year limit for Category II Traffic Control Devices that do not meet NCHRP Report 350 and purchased before the October 1, 2000, date.

704.02 MATERIALS AND EQUIPMENT.

A. **Sign Backing Materials.** Materials for sign backing shall be aluminum, steel, plywood, or plastic of the size and thickness shown on the Standard Drawings. Aluminum or steel backing shall meet and be processed according to Section 754. Plywood backing shall be of exterior grade or be overlaid with a plastic coating, and processed using recommendations of the reflective sheeting manufacturer. Plastic backing shall be processed using recommendations of the reflective sheeting manufacturer.

B. **Reflective Sheeting.** Orange diamond-shaped, rectangular, and square signs shall be faced with Wide Angle Prismatic Fluorescent Retroreflective Sheeting meeting Section 894.02 G. Barricades and vertical panels shall be Wide Angle Prismatic Retroreflective Sheeting meeting Section 894.02 F. Flexible reflective sheeting, Type III C, shall be used on drums, cones, flexible delineators, and tubular markers. All remaining signs and sign backgrounds shall be faced with Wide Angle Prismatic Retroreflective Sheeting meeting Section 894.02 F.

C. **Flexible Roll-Up Sign.** The flexible roll-up sign shall be mounted in a sturdy frame to keep the sign flat and in proper position for viewing by the motorist. The frame shall be attached to a portable stand for placement on the roadbed. The stand shall be weighted or designed to provide stability against wind. Flexible roll-up signs shall be fabricated to meet Section 894.02 E.2.

D. **Flat Sheet Sign Faces.** All flat sheet sign faces, except for flexible roll-up signs as provided above, shall be fabricated to meet Section 894.01.

E. **Barricades.** Barricades shall be constructed of light weight materials. They shall be the type and length shown on the Standard Drawings.

Both sides of the barricade rail surface shall be covered with reflective sheeting as specified.

1. **Wood Rails.** Wood rails shall meet the Standard Rules of the American Lumber Standards. Application of reflective sheeting directly on wood rails shall be made only after all edges and surfaces have been properly sanded, cleaned, sealed, resanded, and painted with a prime coat. The painted surface on which the reflective sheeting is applied shall be treated as specified by the reflective sheeting manufacturer. In lieu of treating the painted surface to receive the reflective sheeting, sheet aluminum having a minimum thickness of .040 inches may be attached to the barricade rails with non-rust fasteners. The aluminum sheet shall be fabricated and degreased as provided in Section 754 before applying reflective sheeting.

2. **Aluminum Rails.** Aluminum rails shall be an extrusion of the size and shape shown on the Standard Drawings and shall meet ASTM Designation B-221, Alloy 6063-T6. They shall be fabricated and degreased as provided in Section 754 before applying reflective sheeting.

F. **Delineator Drums.** Drums shall be approximately 36 inches in height and a minimum of 18 inches in diameter at the top. They shall be constructed of durable plastic with horizontal, circumferential, orange and white reflectorized stripes as shown on the Standard Drawings. The reflectorized stripes shall be fabricated from Type III C, Type IV, or Wide Angle Prismatic flexible reflective sheeting as provided in Section 894.02. Delineator drums shall be weighted with sand placed at the bottom of the drum or constructed so that they can not be blown over or displaced by wind or passing traffic, and do not create a hazard if accidentally struck.

G. **Traffic Cones.** The cones shall be orange in color, shall be a minimum of 28 inches in height with a broadened base, and fabricated from materials that withstand impact. For nighttime use, cones shall have a minimum 6-inch wide white flexible reflectorized band placed a minimum of 3 inches; but not more than 4 inches from the top. An additional 4-inch white reflectorized band shall be placed a minimum of 2 inches below the 6-inch band. The cones shall be weighted at the base to prevent overturning by the wind. The reflectorized band shall be fabricated from Type III C, Type IV or Wide Angle Prismatic flexible reflective sheeting as provided in Section 894.02.

I. **Tubular Markers and Flexible Delineators.** These devices shall be used to channelize traffic.

1. **Tubular Markers.** Tubular markers shall meet the dimensions, color configuration, and installation details as shown on the Standard Drawings.

2. **Flexible Delineators.** The post shall be tough, resilient PVC in orange color. The post shall have 4-inch wide white bands as shown on the plans. The reflective intensity of the bands shall meet the requirements of Type III C, Type IV, or Wide Angle Prismatic flexible reflective sheeting as provided in Section 894.02

I. **Vertical Panels.** The vertical panels shall meet the dimensions, striping configuration, and colors shown on the Standard Drawings. The panels shall be fabricated as specified for flat sheet signs in Section 754.

J. **Delineators.** Each delineator shall consist of an acrylic plastic or reflective sheeting reflector mounted on a post support according to the Standard Drawings.

K. **Portable Barriers.** Precast Concrete Med. Barriers shall meet the details on the Plans or Standard Drawings. Any barriers manufactured after October 1, 2000, must meet the requirements of *NCHRP Report 350*. Continuing use of barriers, purchased and used on previous NDDOT contracts, are approved throughout their useful life.

L. **Warning Lights.** Warning lights are portable, lens directed, enclosed lights. Warning lights shall meet the requirements of the Institute of Traffic Engineers “Purchase Specifications for Flashing and Steady Burn Barricade Warning Lights,” latest revisions and the following table:

	Type A Low Intensity	Type B High Intensity	Type C Steady Burn
Lens Directional Faces	1 or 2	1	1 or 2
Flash Rate Per Minute	55 to 75	55 to 75	Constant
Flash Duration[1]	10%	8%	Constant
Min. Effective Intensity[2]	4.0 Candles	35 Candles	
Min. Beam Candle Power[2]			2.0 Candles
Hours of Operation	Dusk to Dawn	24 hrs./day	Dusk to Dawn

[1] Length of time that instantaneous intensity is equal to or greater than effective intensity.

[2] These values shall be maintained within a solid angle 9^{o} on each side of the vertical axis, and 5^{o} above and below the horizontal axis.

M. **Advance Warning Flashing or Sequencing Arrow Panels.** Advance warning flashing or sequencing arrow panels shall be used to divert and control traffic around construction or maintenance activities.

Advance warning arrow panels shall meet the following requirements:

Advance Warning Flashing or Sequencing Arrow Panel

Type	Minimum Size (in inches)	Minimum No. of Panel Lamps	Minimum Legibility Distance*
A	24 x 48	12	1/2 mile
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

*Minimum legibility requirements are the distances at which the arrow panel message can be comprehended by a driver on a sunny day or a clear night.

The panel face shall be solidly constructed and finished nonreflective black. Panels shall be mounted on a vehicle, trailer, or other suitable support. Vehicle-mounted panels shall be provided with remote controls.

Arrow panels shall be equipped with the following mode selection:

1. Left or right flashing or sequencing arrows, and
2. Double flashing arrows, or
3. Left or right sequencing chevrons, and
4. Caution.

Automatic light dimming controls capable of reducing rated lamp voltage a minimum of 50 percent shall be provided on each arrow panel. The dimming shall be controlled by a photoelectric cell which activates at sunup and sundown. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.

Minimum lamp “on” time shall be 50 percent for the flashing arrow and 25 percent for the sequential chevron.

The arrow panel lamps or lenses shall be recess-mounted or alternately equipped with an upper hood of not less than 180º. The color of the light emitted shall be yellow.

N. **High-Level Warning Device.** This warning device consists of a minimum of 3 flags and, when specified, a Type B high-intensity flashing light. The distance from the roadway to the bottom of the flasher lens or the lowest point of all 3 flags shall be at least 8 feet. The flags shall be a minimum of 16 inches square and shall be orange or fluorescent red-orange in color.

O. **Short-Term Construction Zone Marking and Short-Term Pavement Marking.** The short-term construction zone marking and the short-term pavement marking shall meet Section 762.

P. **Flagging.** STOP/SLOW Sign Paddles shall meet the details specified in the Standard Drawings. The paddle shall be fastened to a rigid handle of five to eight feet in length. The paddle shall be fabricated from light semirigid material, and be octagonal in shape. To improve conspicuity, the paddles may be supplemented by one or two symmetrically positioned, alternately flashing, white high-intensity lamps on each side.

When nighttime flagging is required, sufficient auxiliary lighting shall be used to illuminate the flagging station. This lighting shall be supplied by the contractor and set up in such a manner so that drivers are not blinded by it. A flashlight with a red transparent glowcone, reflectorized clothing, and a reflectorized stop-slow paddle are required for nighttime flagging operations.

Q. **Pilot Car.** The pilot car shall be a pickup truck or automobile. A 36 x 18-inch sign reading “Pilot Car Follow Me,” as detailed in the Standard Drawings shall be mounted on the rear of the vehicle and an oscillating or rotating yellow flashing light shall be mounted on the roof of the vehicle.

704.03 CONSTRUCTION REQUIREMENTS.

A. **General.** The Contractor shall furnish, install, and maintain all required traffic control devices, and shall provide watchpersons and flaggers as necessary to protect the work and to ensure public and workers’ safety. All required control devices shall be available for installation when needed and shall be maintained, relocated, covered, or removed as necessary. Standards for flagging shall be as specified in Section 704.03 X.

When work zone signs placed as shown on the Standard Drawings interfere with permanent signs, the work zone signs shall be moved to locations that afford the best results. Messages shall be varied as required.

The Contractor is responsible for providing the required traffic control to ensure public and worker safety. If the Contractor has not furnished, installed, located, maintained or removed one or more traffic control devices as required, the Engineer may:

1. Apply a contract price reduction of $300 per day if deficiencies are not corrected within a 24 hour period after notification.

2. Without notification, have the deficiencies corrected by another contractor and deduct the cost of the work from monies due or to become due the Contractor.

3. Direct work to cease until the deficiencies have been corrected.

Traffic control devices shall be operated only as long as they are needed. Only those devices that apply to existing conditions shall be in place. Construction sign bases without attached signs shall be marked so they are visible.

The traffic control devices shall have breakaway supports that meet the requirements of the AASHTO Road-side Design Guide Chapter 4 Section 4.1. All signs on fixed supports shall be placed on breakaway supports, unless they are located behind a barrier or crash cushion. The Contractor shall provide documentation showing that these requirements are being met for any sign supports used that do not comply with the NDDOT's Standard D-704-8.

Barricade rails and panels with stripes which begin at the upper right side and slope downward to the lower left side are designated as "right" panels and are to be used on the right side of a traffic lane. Stripes which begin at the upper left side and slope downward to the lower right side are designated as "left" panels and are to be used on the left side of a traffic lane.

B. **Project Terminal Signing.** Before work is started, the required traffic control devices shall be erected at each end of the project and at various locations within the Project as shown on the traffic control Plan drawings entitled, "Construction Sign Layout." These control devices shall remain in place and be maintained for the duration of the Project. The Engineer may direct their removal during winter or other lengthy periods of suspension.

C. **Work Area Signing.** Appropriate traffic control devices as shown on the traffic control Plan drawings entitled "Construction Sign and Barricade Location Details" shall be erected and maintained for each type of work area required by the operations. When no details are provided for the particular type of construction situation involved, traffic control devices shall be installed according to the MUTCD or as directed by the Engineer. No construction work shall be started until the proper traffic control devices for the work area are in place. If the Contractor's construction operations or sequence requires additional signing, flaggers shall be furnished at the Contractor's expense or construction operations shall be suspended in that area until the condition is corrected and the required signs have been installed.

When traffic is carried through the construction area, 2-way traffic shall be maintained when practicable. One-way traffic shall be directed by flagpersons or maintained under control of an approved traffic signal system. All signs and other control devices shall indicate actual conditions and shall be relocated, removed, or changed as conditions require. Signs necessary only during hours when work is actually being performed shall be removed or completely covered when no work is in progress.

Portable signs shall be used when construction operations in an area are temporary. Temporary operations are those that can generally be completed in 5 days or less. If unforeseen circumstances occur, such as equipment breakdown, rain, subgrade failures, etc., time will not accrue towards the 5-day period.

When portable signs are used, they shall be placed on the shoulder or outside of the traveled lane where they do not pose a hazard to traffic. The portable signs shall be placed in clear view without any sight obstructions to oncoming traffic. When portable signs are not in use, they shall be removed, moved to a minimum of 45 feet from the edge of the traveled lane, or laid down on the inslope. Signs laid on the inslope shall have stand bases constructed so the signs and bases can be placed flat with no portions of the sign or base projecting upward from the inslope more than 6 inches.

The portable signs support assembly mounted on trailers shall meet the requirements as specified above for portable signs except as follows. The portable signs mounted on trailers that have passed the crash test required of NCHRP Report 350 as approved by the FHWA shall be used. When portable signs mounted on trailers are used, they shall be removed, moved a minimum of 45 feet from the edge of the traveled way, or covered so the sign message cannot be read by approaching vehicles.

D. **Existing Signs.** Existing regulatory traffic signs which must be moved to accommodate construction shall be immediately reset.

The cost to remove and reset existing traffic signs to accommodate construction shall be included in the price bid for other items.

E. **Route Markers.** Route marker signs required for the Project and for Contractor-maintained detours will be furnished by the Department and shall be installed by the Contractor on supports furnished by and at the Contractor's expense.

F. **Detour Signing.** The Contractor shall furnish, install, and maintain all traffic control devices for detours.

G. **Highways Closed to Traffic.** When a detour is provided and traffic is not maintained through the construction area, necessary access to property abutting the Project shall be provided by constructing and maintaining temporary roads and approaches from the nearest crossroad. Traffic shall not be routed over detours not provided in the Contract documents without written authorization from the Engineer.

H. **Restricted Speed Zones.** Restricted speed zones and the speed limit to be posted for such zones will be designated in the Contract documents or determined by the Engineer.

I. **Temporary Suspension.** During a temporary suspension of work, the Contractor is responsible for maintaining and protecting traffic. When operations are suspended for the winter or are indefinitely suspended for reasons beyond the Contractor's control, the roadway and the traffic control devices will be maintained by and at the Department's expense.

Before suspending operations for the winter, adequate approaches shall be constructed to all crossroads or intersecting roads which have been disturbed by construction operations. Access to the roadway from abutting property shall also be provided. Warning signs, barricades, and other traffic control devices shall be erected (or existing devices removed) as directed by the Engineer. Resetting of signs removed because of a winter suspension will not be measured for payment.

J. **Barricade Application.** Type I or Type II barricades shall be used as shown in the traffic control plan details where traffic is maintained through the construction area. They may be used singly or in groups to mark a specific hazard, or used in a series to channelize traffic and shall not be set parallel to traffic. On high-speed roads or in situations where barricades may be overturned in the wind, the barricades shall be stabilized with sandbags placed on the lower parts of the frame or stays.

When a section of road is closed to traffic, Type III barricades shall be erected at the points of closure. They shall extend completely across the roadway and shoulders or from curb to curb. Where provision must be made for access of equipment and authorized vehicles, the Type III barricades shall be provided with gates or movable sections that can be closed when work is not in progress, or with indirect openings that discourages public entry. Where access is provided through the Type III barricade, an employee shall be designated to assure proper closure at the end of each working day.

When a road or street is closed, but access to local traffic must be furnished, the Type III barricades shall be arranged to permit local use but discourage through traffic. A sign with the appropriate legend concerning use by local traffic shall be installed.

Type III barricades shall be installed at the beginning and end of the project when so indicated in the Contract documents and shall not be placed parallel to traffic.

The required warning signs shall be mounted above the barricades.

If the construction zone encroaches onto sidewalks or crosswalks and pedestrians cannot be diverted to other walkways, barricades may be used to define the path.

K. **Drum Application.** Drums shall be used to channelize or delineate traffic flow, and may be used singly or in groups to mark specific hazards. When drums are placed in the roadway, advance warning signs are required.

L. **Traffic Cone and Tubular Marker Application.** Traffic cones and tubular markers used to channelize traffic shall have adequate stability to prevent overturning or displacement by wind. Additional weighting may be required but shall not be so heavy to cause a hazard if struck.

M. **Flexible Delineator Application.** Flexible delineators used to channelize traffic and separate 2-way traffic shall be located and attached as shown in the Plans. The Contractor shall maintain the delineators until they are removed. The delineators shall be removed as soon as the new roadway is opened to traffic and shall remain the property of the contractor.

If flexible stake delineators are used, the wide side shall face the traffic. If the delineator is to be seen by side traffic, an additional delineator shall have the wide side placed facing the side traffic. The side traffic delineators shall not be paid for, but shall be incidental to the price bid for “Flexible Delineators.”

N. **Vertical Panel Application.** Vertical panels shall be used as channelizing devices, warning devices, or windrow markers. Vertical panels shall be faced on both sides.

O. **Delineator Application.** Delineators shall be used in construction areas for guidance, to indicate roadway alignment, and to outline the required vehicle path. Delineators shall not be used as warning devices and, when used in a construction zone, shall be combined with approved warning devices.

Delineators shall be mounted on supports so the reflector is 4 feet above the roadway edge. White reflectors shall be used for delineators installed along the right side of the street or highway. Yellow reflectors shall be used for delineators installed along the left edge of divided streets, divided highways, and one-way roads.

Delineator spacing shall be as indicated on the traffic control plan sheets. Along roadway curves, delineators shall be spaced so that several delineators are always visible to the driver.

P. **Portable Barrier Application.** Traffic control plan sheets may require, or the Contractor may elect to use, portable barriers to separate the work area from the traffic area. For nighttime use, the barriers shall be supplemented by standard delineators or channelizing markings or devices.

When specified, warning lights shall be installed on continuous barriers. The first 2 warning lights on each side of the roadway shall be Type A flashers, and subsequent lights on the barrier shall be Type C steady burn lights.

The ends of the barrier shall be protected by crash cushions or by flaring the barrier ends away from the traveled way as shown in the Contract.

Q. **Lighting Device Application.** Lighting devices shall be provided as required on the traffic control plan sheets to supplement signs, barricades, and other traffic control devices.

1. **Type III or IV Reflective Sheeting.** Flashing lights and steady burn lights on signs, drums, vertical panels, and barricades are not required when Type III or Type IV reflective sheeting is used.

2. **Flashing Lights (Type A, Low-Intensity).** Type A low-intensity flashers shall be used to warn drivers that they are approaching or traveling in a hazardous area.

3. **Flashing Lights (Type B, High-Intensity).** Traffic control plan sheets require installation of high-intensity flashers at extremely hazardous site conditions. The high-intensity flashers shall be operated 24 hours per day.

4. **Steady-Burn Lights (Type C).** The steady-burn warning lights shall be used to delineate the edges of the traveled way on detour curves, on lane changes, and along tapers. Spacing of steady-burn lights shall be as indicated on the traffic control plan sheets.

5. **Mounting Height of Warning Lights.** The mounting height of warning lights shall be as follows:

    a. **Barricade and Portable Standards.** A minimum height of 36 inches from the bottom of the lens to the roadway.

b. **Signs.** The bottom of the light housing shall not be less than 2 inches nor more than 12 inches above the top of the sign.

c. **Vertical Channelizing Devices and Independent Supports.** The light shall be at least 4 feet and not more than 5 feet above the pavement.

6. **Advance Warning Arrow Panels.** The sequencing arrow panels shall be used to provide advance warning and directional information to assist in diverting and controlling traffic around construction activities being conducted on or adjacent to the traveled way. Other traffic control devices may be required in conjunction with the sequencing arrow panel. During nighttime operation of the flashing arrow panels, the lamps shall be automatically dimmed to 50% of the output.

7. **Floodlights.** If construction activities are performed at night, floodlighting shall be provided for the construction area and flagger stations. The area must be adequately illuminated without creating glare in the eyes of drivers.

R. **High-Level Warning Device.** High-level warning devices shall be used to supplement other controls and devices and shall be required in urban high-density traffic situations.

S. **Pavement Marking Removal.** Removal of existing marking and installation of short-term marking shall be as shown on the traffic control plan sheets. Inappropriate existing markings shall be removed and the new delineation placed before opening the affected lane or lanes to traffic.

Removal of pavement markings shall not permanently damage the surface or texture of the pavement. Painting over existing stripes is not permitted. Where blast cleaning is used for removal of markings or other objectionable material, the sand or other blast material left on the pavement shall be removed immediately.

T. **Construction Zone Marking.** Yellow short-term marking shall be used to delineate traffic flow in opposing directions or mark the left edge of the pavement of divided highway or one-way roads. White short-term marking shall be used to delineate the separation of traffic flow in the same direction or mark the right edge of the pavement. The short-term markings shall be used in combination with appropriate warning signs, channelizing devices, and delineation to clearly indicate the required vehicle paths.

U. **Traffic Control Personnel.**

1. **Traffic Control Supervisor.** When called for on the Plans, the Contractor shall designate a qualified traffic control supervisor. This supervisor shall be in addition to the watchperson specified in Section 704.03 U.2.

If this traffic control supervisor becomes unavailable on the project, the Contractor shall designate a qualified replacement supervisor.

a. **Qualifications.** The traffic control supervisor shall:

(1) Have completed an NDDOT-approved comprehensive course of study based on Part VI of the MUTCD and furnish proof thereof.

(2) Be familiar with the requirements of NDDOT traffic control plans and specifications.

(3) Have a total of at least 12 months field experience with traffic control plans, layouts and maintenance.

(4) Be competent to supervise personnel in traffic control operations.

b. **Duties.** The traffic control supervisor shall:

(1) Provide traffic control as required by the plans, specifications, MUTCD, or as directed by the engineer.

(2) Be on the site daily to supervise the installation, operation, inspection, maintenance, and removal of the traffic control system.

(3) Correct traffic control conditions that cause erratic vehicle movements, unexpected braking, etc.

(4) Propose changes to improve traffic flow through the work zone.

(5) Be accessible to the job site within one hour of notification and be "on call" on a 24-hour basis.

(6) Provide the Engineer with documentation of all traffic control activities required in paragraph (2) above.

(7) Function as watchperson in his/her absence.

c. **Traffic Control Course**. The course prescribed in Section 704.03 U.1.a(1) above shall be the American Traffic Safety Service Association (ATSSA) 16-hour Traffic Control Supervisor Course, American General Contractor (AGC) 16-hour Traffic Control Supervisor Course, or the 20-hour National Highway Institute (NHI) Course 38003, Design and Operation of Work Zone Traffic Control, or equal.

An equal course shall include the following subjects: Manual and Standard Signs used in Work Areas (3 hours); Channelizing Devices and Temporary Barriers, Pavement Markings, Lighting Devices, Arrow Displays and Special Devices, and Devices Location and Placement (4 hours); Layout for Traffic Control Devices, Motorist Characteristics, and Options and Alternatives (4 hours); Installation and Removal of the Traffic Control Zone, and Operation and Maintenance of the Traffic Control Zone (4 hours); Flagging Operations, Legal Liability and Record Keeping, and Emergency Situations (5 hours).

Workshops shall be included in the above time frames covering (a) design problems, (b) installation and removal, and (c) operations and maintenance. Each session shall also include a question and answer period.

2. **Watchpersons.** Watchpersons shall be provided to patrol the project to assure that the traffic control devices are properly placed in accordance with the traffic control plans and standards. The project shall be patrolled at least

twice daily, once in the morning prior to work beginning and once in the evening after work is completed. The project shall also be patrolled twice daily on weekends and days when no work is in progress, once each morning and once each evening before sunset.

The Contractor shall provide written documentation to the Engineer of the watchperson's hours and activities.

The Contractor shall immediately assist the watchperson, whenever needed, to correct conditions that cause erratic traffic movement, unexpected braking, etc., and erect, repair, replace, or relocate the required traffic control devices. Emergency assistance shall be provided to motorists, when needed, due to roadway conditions. Suspension of watchperson service may be permitted during periods of authorized suspension or after substantial completion of the work, provided the job site is in safe condition.

V. **Emergency Control.** Written notification shall be provided to the Engineer, the State Police, and local law enforcement agencies, of the names, addresses, and telephone numbers of the Contractor's Superintendent and an alternate. Either the Superintendent or the alternate shall be on call for notification of any emergencies that may arise during periods when construction operations are not in progress. Changes in the designation of the Superintendent or the alternate shall immediately be made known, in writing, to the Engineer and the law enforcement agencies.

The Contractor's Superintendent or alternate, or traffic control foreman shall meet with the Engineer before work commences to review traffic control plans, and shall be available at all times to periodically discuss modifications to the traffic control plan with the Engineer or his representative.

When an emergency occurs and the Superintendent or alternate are not available to take protective or corrective measures, the Department will authorize others to do the necessary work and deduct the cost of the work from the Contractor.

W. **Maintenance of Traffic Control Devices.** Traffic Control Devices used on the Project will be rated according to the American Traffic Safety Services Association's (ATSSA) *Quality Standards for Work Zone Traffic Control Devices*. The definitions of "acceptable," "marginal," and "unacceptable" and the evaluation guidelines shall be as defined in ATSSA's *Quality Standards for Work Zone Traffic Control Devices*.

At the time of initial set up and major phase changes, 100% of each type of device (signs, barricades, vertical panels, drums, cones, tubular markers, warning lights, arrow panels, etc.) shall be classified as acceptable. The contractor shall certify in writing to the Engineer that all traffic control devices installed are classified as acceptable.

For signs, barricades, vertical panels, drums, cones, tubular markers, and arrow panels the number of acceptable devices of each type may decrease to 75% of the initial quantity as a result of damage or deterioration during the course of work. The remaining 25% of each type of devices may be in the marginal category. Warning lights shall be "acceptable" or "marginal" at the limits defined in the ATSSA standards. All unacceptable devices found on the job site shall be replaced within 12 hours.

Traffic control devices not covered by the evaluation guidelines shall be maintained to operate effectively and be in good repair.

Traffic control devices shall be cleaned as necessary to remove dirt, mud, or other foreign material which reduces the brightness of the reflectorized sheeting or warning lights.

X. **Flagging.** Flaggers shall be clean, neat, and fully dressed at all times while on duty either day or night. For daytime work, the flagger's vest, shirt, or jacket shall be orange, yellow, strong yellow green, or fluorescent versions of these colors. For nighttime work, similar outside garments shall be retroreflective. The retroreflective material shall be orange, yellow, white, silver, strong yellow-green, or a fluorescent version of one of these colors and shall be visible at a minimum distance of 1,000 feet. The retroreflective clothing shall be designed to identify clearly the wearer as a person and be visible through the full range of body motions.

Each flagger shall be furnished with the booklet, "Flagging Handbook," and shall observe the rules and regulations contained therein. The Contractor shall obtain copies of the "Flagging Handbook" from the Department.

Flaggers shall not be assigned other duties while working as authorized flaggers.

The Contractor is responsible for providing trained flaggers. All flaggers must view a flagging video training tape and pass a flagging written examination before performing flagging on the project. The Contractor will acknowledge in writing, before any flagging work begins on the project, that all flaggers will have viewed a flagging video tape and passed a written examination before performing flagging on the project.

Y. **Pilot Car.** A pilot car shall be used to guide vehicles through or around the construction area when traffic is reduced to a single-lane. The pilot car operation must be coordinated with flagging operations or other controls at each end of the one-lane section.

Z. **Flag Application.** Flags shall be attached to warning signs if indicated in the traffic control plan sheets.

704.04 METHOD OF MEASUREMENT.

A. Individual traffic control items shall include furnishing, installing, maintaining, relocating, and removing as dictated by the work in progress and will be measured for payment as follows:

1. **Traffic Control Signs.** Traffic Control Signs will be measured by the unit and will be inventoried when complete, in place, and accepted by the Engineer. All posts and mounting hardware required to complete the installation will be included in the pay item. The total units of Traffic Control Signs shown in the Plans is estimated and may be adjusted according to the needs of the Project.

2. The following devices will be measured by the number of each installed, complete, in place, and accepted by the Engineer:

a. Barricades (by type)

b. Delineator Drums

c. Traffic Cones

d. Delineators

e. Flexible Delineators

f. Vertical Panels

g. Sequencing Arrow Panels (by type)

h. Tubular Markers

No measurement will be made of devices which are installed without being authorized by, or directed by, the Engineer.

B. **Traffic Control.** When "Traffic Control," is included in the Contract as a lump sum, it includes all traffic control necessary for the project construction except as otherwise provided. Payment includes furnishing, installing, and maintaining the required signs, barricades, and other warning devices; relocating or removing devices as dictated by the work progress; and providing watchpersons to patrol the work.

No payment (over the lump sum bid for "Traffic Control") will be authorized for additional traffic control devices required as a result of the Contractor's method or sequence of operation, whether or not the type of operation is included in the typical work area layouts shown on the traffic control plan sheets.

Payment (over the lump sum bid for "Traffic Control") may be authorized for additional traffic control devices if the type or number of such devices requested by the Engineer exceeds the requirements indicated by the typical work area layouts shown on the traffic control plan sheets, or when the need for additional traffic control devices is created as a result of Contract revisions.

C. **Obliteration of Pavement Marking.** Obliteration of Pavement Marking will be measured according to Section 762.05 E., and paid for according to Section 762.06.

D. **Flagging.** Flagging will be measured by the hour of authorized flagging. Authorized flagging shall be the actual hours of flagging authorized by the Engineer.

E. **Pilot Car.** Pilot Car, when included in the Contract as a separate bid item, will be measured by the hours of pilot car use as authorized by the Engineer.

704.05 BASIS OF PAYMENT.

A. Payment for Traffic Control Signs will be made following proper installation of the signs. Payment for each Traffic Control Sign will be its unit value listed in the Plans multiplied by the Contract Unit Price per unit. Payment will be full compensation for all labor, equipment, and materials necessary to complete the work as specified.

If signs mounted on fixed supports must be relocated due to a change of Plans or as directed by the Engineer, the Contractor will receive a relocation payment in the amount of 50% of the payment for the installed signs as determined above.

Unless otherwise shown on the Plans, additional payment will not be made for any existing Traffic Signs, Traffic Control Signs, and other devices turned away, covered up, taken temporarily out of service, and then returned to use; or for any signs and devices relocated as required by construction operations.

If the Contractor is required to furnish special non-standard signs not shown on the Plans, a unit value agreeable to the Contractor and the Department will be established for such signs, and payment will be made according to the Contract Bid Price per sign unit. If a unit value cannot be agreed upon, payment will be made at invoice price plus 15%, and the sign will become the Department's property after it has been removed from service. Payment for sign supports and installation of special signs will be made using the prices listed in the "Rental Rates for Equipment and Traffic Control Devices" published by the Department.

Payment will be made at the Contract Unit Price for the following:

Pay Item	**Pay Unit**
Traffic Control Signs	Unit
Type I Barricade	Each
Type II Barricade	Each
Type III Barricade	Each
Delineator Drums	Each
Traffic Cones	Each
Delineators	Each
Flexible Delineators	Each
Vertical Panels	Each
Sequencing Arrow Panels, Type--	Each
Remove and Reset Existing Traffic Signs	Each
Tubular Markers	Each
Precast Concrete Median Barrier (state furnished)	Each
Portable Precast Concrete Median Barrier	LF

The Contractor will be paid the Contract Unit Price for the above items when the devices have been properly installed and have been accepted by the Engineer.

No payment will be made for devices added or relocated without authorization of the Engineer.

Devices removed from the Project without approval of the Engineer shall be replaced as directed at the Contractor's expense.

This payment will be full compensation for all labor, equipment, and materials necessary to complete the work.

B. When the item “Traffic Control” is bid as a Lump Sum, payment for the Contract Lump Sum bid will be made according to the following schedule:

Total Payment to Date		
40%	-	When all initial traffic control devices required to start construction have been installed.
50%	-	When Contract is 25% complete.
75%	-	When Contract is 50% complete.
90%	-	When Contract is 75% complete.
100%	-	When Contract is complete.

When additional traffic control devices requested by the Engineer qualify for payment according to Section 704.04 B, payment for furnishing and installing such devices will be made using the prices listed in the “Rental Rates for Equipment and Traffic Control Devices” published by the Department.

The above payments for installation include the cost of removing or relocating the traffic control devices. No additional payment will be made when traffic control devices are covered up, or temporarily taken out of service, then returned to use.

All standard traffic control devices furnished by the Contractor shall remain the property of the Contractor.

If the Contractor is required to furnish special non-standard signs not shown on the Plans, payment will be made at invoice price plus 15%, and the sign will become the Department’s property after it has been removed from service. Payment for sign supports and installation of special signs will be made using the prices listed in the “Rental Rates for Equipment and Traffic Control Devices” published by the Department.

C. Obliteration of Pavement Marking, when included in the Contract as a separate pay item, will be paid for according to Section 762.06.

When no pay item is provided, the Obliteration of Pavement Marking will be paid for under Section 104.03 D.

D. Flagging will be paid for at the Contract Unit Price per hour for the total authorized hours of flagging as measured in Section 704.04 D.

E. Pilot Car will be paid for at the Contract Unit Price per hour for the total hours authorized by the Engineer.

F. Short-Term Pavement Markings, when included in the Contract as separate pay items, will be paid for at the Contract Unit Price under Section 762.06.

G. Items requested by the Engineer that are not listed on the Plans or Standard Drawings as incidental items or separate pay items such as Flashing and Steady Burn Lights, Concrete Median Barriers, Attenuation Devices, etc., will be paid for under Section 104.03 D.

H. The cost of providing Traffic Control Supervisors, when needed, and Watchpersons will be incidental to the prices bid for other items.